

What is claimed is:

1. A backlight device comprising:

a light guide plate having a light incident face and a light emission face;

a rotary member adapted to be rotated along a rotary shaft thereof and disposed opposite to the light incident face of the light guide plate;

a rotary drive mechanism for rotating the rotary member;

a plurality of mercury-free fluorescent lamps, each comprising an arc tube mounted on the rotary member so as to extend substantially parallel to the rotary shaft, a mercury-free discharge medium consisting essentially of a rare gas sealed within the arc tube, and first and second electrodes for exciting the discharge medium, the mercury-free fluorescent lamps being capable of emitting light of respectively different colors, and the emitted light entering the light guide plate through the light incident face and emerging from the light emission face; and

a power feed control mechanism for applying a voltage to the first and second electrodes of each of the mercury-free fluorescent lamps.

2. A backlight device according to claim 1, wherein the rare gas includes at least one kind of gas selected from the group consisting of krypton gas, argon gas, helium gas,

and xenon gas.

3. A backlight device according to claim 1, wherein the first electrode is arranged within the arc tube, and

wherein the second electrode comprises a plurality of segmented electrodes arranged on an outer surface of the rotary member so as to be spaced apart from each other in an extending direction of the rotary shaft, and contacting with an outer peripheral surface of the arc tube.

4. A backlight device according to claim 3, further comprising a power feed circuit for generating the voltage for exciting the discharge medium, wherein the power feed control mechanism comprises:

first and second cylindrical members provided at both ends of the rotary member so as to be coaxial with the rotary shaft;

a plurality of first contacts provided on a side peripheral surface of the first cylindrical member, each of the first contacts being electrically connected to the first electrode of corresponding one of the mercury-free fluorescent lamps;

a second contact provided on a side peripheral surface of the second cylindrical member and electrically connected to the second electrode;

a first terminal having one end being abutted to the side peripheral surface of the first cylindrical member and

the other end being electrically connected to the power feed circuit; and

a second terminal having one end being abutted to the side peripheral surface of the second cylindrical member and the other end being electrically connected to the power feed circuit, and

wherein the first terminal is contacted with at least one of the plurality of first contacts corresponding to a rotational angular position of the first cylindrical member, while the second terminal is held in contact with the second contact irrespective of a rotational angular position of the second cylindrical member, whereby the voltage is applied to the first and second electrodes of corresponding one of the plurality of mercury-free fluorescent lamps in sequential and intermittent manner to excite the discharge medium.

5. A backlight device according to claim 1, further comprising a reflection member disposed on the opposite side of the light incident face with respect to the rotary member and being capable of reflecting the light emitted from each of the mercury-free fluorescent lamps toward the light incident face.

6. A backlight device according to claim 1, wherein the light guide plate has a pair of the light incident faces opposite to each other, and

wherein the rotary member mounted with the mercury-free fluorescent lamps is disposed opposing to each of the light incident faces.

7. A backlight device according to claim 1, wherein the light incident face of the light guide plate is disposed opposite to the light emission face, and

wherein the backlight device comprises a plurality of the rotary members each mounted with the mercury-free fluorescent lamps, the plurality of the rotary members being disposed opposite to the light incident face and parallel to each other.

8. A backlight device according to claim 1, wherein the arc tube of the mercury-free fluorescent lamp has a straight tube shape extending in parallel to the rotary shaft.

9. A backlight device according to claim 1, wherein the arc tube of the mercury-free fluorescent lamp has a spiral shape, and a center axis of the spiral shape extends in parallel to the rotary shaft.

10. A liquid crystal display apparatus comprising:
a liquid crystal display panel; and
a backlight device mounted facing a rear surface of the liquid crystal display panel,
wherein the backlight device comprises:

a light guide plate having a light incident face and a light emission face opposite to the rear surface of the liquid crystal display panel;

a rotary member adapted to be rotated along a rotary shaft thereof and disposed opposite to the light incident face of the light guide plate;

a rotary drive mechanism for rotating the rotary member;

a plurality of mercury-free fluorescent lamps, each comprising an arc tube mounted on the rotary member so as to extend substantially parallel to the rotary shaft, a mercury-free discharge medium consisting essentially of a rare gas sealed within the arc tube, and first and second electrodes for exciting the discharge medium, the mercury-free fluorescent lamps being capable of emitting light of respectively different colors, and the emitted light entering the light guide plate through the light incident face and emerging from the light emission face; and

a power feed control mechanism for applying a voltage to the first and second electrodes of each of the mercury-free fluorescent lamps.

11. A liquid crystal display apparatus according to claim 10, wherein the rare gas includes at least one kind of gas selected from the group consisting of krypton gas, argon gas, helium gas, and xenon gas.

12. A liquid crystal display apparatus according to claim 10, wherein the first electrode is arranged within the arc tube, and

wherein the second electrode comprises a plurality of segmented electrodes arranged on an outer surface of the an extending direction of the rotary shaft, and contacting with an outer peripheral surface of the arc tube.

13. A liquid crystal display apparatus according to claim 10, further comprising a power feed circuit for generating the voltage for exciting the discharge medium, wherein the power feed control mechanism comprises:

first and second cylindrical members provided at both ends of the rotary member so as to be coaxial with the rotary shaft;

a plurality of first contacts provided on a side peripheral surface of the first cylindrical member, each of the first contacts being electrically connected to the first electrode of corresponding one of the mercury-free fluorescent lamps;

a second contact provided on a side peripheral surface of the second cylindrical member and electrically connected to the second electrode;

a first terminal having one end being abutted to the side peripheral surface of the first cylindrical member and

the other end being electrically connected to the power feed circuit; and

a second terminal having one end being abutted to the side peripheral surface of the second cylindrical member and the other end being electrically connected to the power feed circuit, and

wherein the first terminal is contacted with at least one of the plurality of first contacts corresponding to a rotational angular position of the first cylindrical member, while the second terminal is held in contact with the second contact irrespective of a rotational angular position of the second cylindrical member, whereby the voltage is applied to the first and second electrodes of corresponding one of the plurality of mercury-free fluorescent lamps in sequential and intermittent manner to excite the discharge medium.

14. A liquid crystal display apparatus according to claim 10, further comprising a reflection member disposed on the opposite side of the light incident face with respect to the rotary member and being capable of reflecting the light emitted from each of the mercury-free fluorescent lamps toward the light incident face.

15. A liquid crystal display apparatus according to claim 10, wherein the light guide plate has a pair of the light incident faces opposite to each other, and

wherein the rotary member mounted with the mercury-free fluorescent lamps is disposed opposing to each of the light incident faces.

16. A liquid crystal display apparatus according to claim 10, wherein the light incident face of the light guide plate is disposed opposite to the light emission face, and

wherein the backlight device comprises a plurality of the rotary members each mounted with the mercury-free fluorescent lamps, the plurality of the rotary members being disposed opposite to the light incident face and parallel to each other.

17. A liquid crystal display apparatus according to claim 10, wherein the arc tube of the mercury-free fluorescent lamp has a straight tube shape extending in parallel to the rotary shaft.

18. A liquid crystal display apparatus according to claim 10, wherein the arc tube of the mercury-free fluorescent lamp has a spiral shape, and a center axis of the spiral shape extends in parallel to the rotary shaft.